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ON THE ORIBATOIDEA OF THE UNITED STATES.

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The Oribatid mites are easily recognized by the division of the body into two regions, cephalothorax and abdomen, by the presence of a seta to a small pore near each posterior corner of the cephalothorax, by having the legs in the normal position (not separated in pairs), and by their coriaceous tegument. Because of this latter character they have often been called "beetle-mites." The body of an Oribatid is readily divided into two parts, the smaller and anterior portion is the cephalothorax, the posterior part is the abdomen; beneath the tip of the cephalothorax is a distinct, articulated portion, the true head. To the head is attached the mandibles and palpi, both of minute proportions. The cephalothorax is usually more or less triangular; a plate of tegument frequently extends from the base of the abdomen down upon the cephalothorax, thus making the surface of the cephalothorax continuous with that of the abdomen, and the dorsal outline entire. This plate is known as the tectal plate or tectum. Whenever there is a distinct break in the dorsal outline of the body at the junction of the cephalothorax and abdomen the tectal plate is considered to be absent. And on this character the true Oribatidæ is divided into two sub-families, the Nothrinae in which it is absent, and Oribatinae in which it is present. Most of the genera of the former have but one claw to tarsus, and most of the genera of the latter have three claws; but there are prominent exceptions in each group. In some forms the tectal plate is free at

tip and divided into spines, more often it is wholly united to the cephalothorax and only lateral lines or ridges mark its position; at its tip there is nearly always a pair of bristles, the anterior bristles; and above near base another pair is often present, the superior bristles. Near each posterior angle or corner of the cephalothorax is a round spot or pore; from it arises a seta, often clavate; these pores are supposed to be the breathing stigmata. The legs arise from the underside of the cephalothorax, the posterior pairs apparently coming from the abdomen; the coxæ are often more or less united into a plate, the coxal plate; but there is no real sternum. The legs consist of a coxa, a trochanter, longer femur, a short patella, a long tibia, and a metatarsus and tarsus; the latter two are often more or less united. The claws vary from one to three in number. The abdomen is of various shapes, often quite globose; the dorsum is separated from the venter by a lateral line which is really double. In some forms the base of the abdomen bears lateral expansions of the tegument, these are called wings. On the venter are two apertures, the basal one is the genital opening; the apical one, the anal opening; they are closed by two laterally hinged plates meeting on the median line.

The young are soft-bodied mites, often obovate in form, and sometimes with curious markings. In those species which have three tarsal claws the young usually have but one claw. The young have frequently been mistaken for adults and described under various genera, as *Murcia*, *Hypochthonius*, *Claviceps*, *Michaelia*, etc. The mite upon attaining the adult structure is not necessarily adult; at least they moult several times afterward. These young, but not larval forms are usually paler than the adult, but otherwise do not differ, except in size. According to Michael, who has studied the British species of this family very carefully, the young may be born in four ways: I, as in the insects, the eggs laid and after a time hatching; II, the eggs hatching as soon as laid; III, the eggs hatching just before extrusion, ovo-viviparous; IV, the eggs never being laid, but hatching within the parent some time after the latter's death.

The species are all small, rarely one millimetre long. They occur in many situations, but none, so far as I know, regularly inhabit houses or other buildings. Some occur under the loose bark of dead trees, others on the bark; some on plants, as grass and weeds in meadows; sometimes even in flowers. Some occur in decaying

animal or vegetable substances, as bones, dead fungi, decaying sod. A number inhabit moss, especially *Sphagnum*. Some live on the ground, hiding in crevices, under leaves, sticks, etc. A few are found on water plants, and one on the rocks between tides. They all move quite slowly, and when disturbed are apt to "play possum" and be overlooked. Most of the species are vegetable feeders or scavengers. In the former role they may be injurious, as *O. pratensis*, which is very common in meadows, and *O. arborea*, which occurs in great numbers on cedar and peach trees. In the role of scavengers they may often be beneficial. Packard has stated that *Nothrus orivorus* sucks the eggs of the canker-worm moth.

Say, in the Jour. Acad. Nat. Sci. of Phil. vol. ii, 1821, described two species of *Oribata*,—*O. concentrica* and *O. glabrata*, both of which I have identified. The former by the peculiar structure of its abdomen is easily placed in *Liodes*; the latter must be an Hoplophorid, as Say states that the cephalothorax can be deflected on the abdomen, and I have considered it to be the common form which I have collected, and which agrees with the description. Dr. Riley described *Hoplophora arctata* in vi Mo. Rept. 1874 (also in St. Louis Acad. Science). From his figures it appears to be a *Tritia*, and I think the young of *T. glabrata* Say. Prof. Packard, in his "Guide to the Study of Insects," described *Nothrus orivorus*; and Mr. Ashmead, in "Can. Ent." 1879, described *Oribata aspidiotii*. These two forms are very similar, and perhaps, as Haller suggests, identical; I have seen nothing that would agree with them. Their characters are very peculiar, and if adult (which is doubtful) they would certainly be neither *Oribata* nor *Nothrus*, nor would they fit in any genus known to me. *O. aspidiotii* certainly seems to be a young form. Fitch, in the 3d N. Y. Rept., describes *Oribates 4-pilis*; the description is so short and incomplete it is impossible to definitely identify it. Considering its habits I have seen nothing that would fit it; two species of *Oribata* are known to me as occurring in numbers under bark, but both are smooth. It may be my *Scutovertex pilosus*. Karpelles (Beit. z. Naturgesch. d. Milben, Berlin, 1883) has described two species of *Nothrus* from Pennsylvania, *N. malleolus* and *N. pileiformis*. Both are very strange forms (according to the descriptions), and I doubt if they are Oribatids at all, at least not adult ones. I have seen nothing that would agree with them.

Haller (Beschr. ein. neu. Milben, I Amerikanischer Arten; Arch. für Naturgesch. 1884) describes five species from "Amerika" (*Ori-*

bata simplex, *O. monodactyla*, *O. rileyi*, *O. americana* and *Eremacus leporus*). They are probably from Central America, and I have not seen any of them. Berlese states that *O. monodactyla* is the same as *O. dentatus* Berlese. Packard (Cave Memoir) described *Oribata alata* and *Damascus bulbipedata*. The descriptions are incomplete, and the figures not very definite; the former name is pre-occupied by the common European form, and it appears to be similar to my *O. robusta*. The latter, as stated in the text, is a *Belba*; it differs from *B. minuta* Bks. in having only a few hairs on the abdomen, and in some minor characters of the legs. Dr. Riley, in his notes to Hubbard's "Orange Insects," describes *Hermannia* (?) *trinebulosa*. This is undoubtedly a larval Oribatid, and I have seen forms quite like it, but I am not sure to what species it belongs. The three species placed by Koch in the genus *Clariceps* (Arach. aus. Siberien, etc.) are young Oribatids; two species very similar to Dr. Riley's form. The larvae of *Oribata pratensis* and *O. arborea*, which I have collected are of the same shape, but lack the dark patches.

I have seen no form that would exactly fit European species; but *Nothrus excisus*, found on the bark of evergreens, comes very close to the European *N. segnis* found in similar situations. Perhaps on a comparison of specimens, some of our species will prove to be the same as some European forms, particularly those from the northern part of Europe.

The super-family Oribatoidea is at once divided into two well-marked families: the Oribatidæ, in which the cephalothorax is immovably attached to the abdomen; and the Hoplophoridæ,* in which the cephalothorax is movable. The latter family have the dorsum of the abdomen continued down on the sides and venter, leaving only a small ventral region. The Oribatidæ are readily divided into two sub-families by the presence (Oribatidæ) or absence (Nothrinæ) of a tectal plate. Some authors consider these as families, and equivalent to the Hoplophoridæ. Berlese places two other families in this super-family, the Tarsonemidæ and the Panopliidæ. Canestrini places the Tarsonemidæ next to the Tyroglyphidæ. Neither of the families has much resemblance to ordinary Oribatids, and no forms have been recorded from the United States. The Hoplopidæ are also sometimes placed close to the Oribatidæ; the species are rare, and no forms are known to me.

* This name, I suppose, will have to be changed, as *Hoplophora* is pre-occupied in the Membracidæ; the other genus of the family, *Tritia*, is, I believe, pre-occupied in the Gasteropods.

ORIBATIDÆ.

The following genera are known to me :

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| 1.—With a tectal plate..... | 2. |
| No tectal plate..... | 6. |
| 2.—With wings to abdomen..... | 3. |
| No wings..... | 5. |
| 3.—One claw to tarsus..... | Oribatodes. |
| Three claws to tarsus..... | 4. |
| 4.—Tectal plate wholly attached to the cephalothorax, entire..... | Oribata. |
| Tectal plate free at tip, which is more or less deeply cleft..... | Oribatella. |
| 5.—Tectal plate quite large, free at tip..... | Cephus. |
| Tectal plate small, wholly attached to cephalothorax..... | Scutovertex. |
| 6.—One claw to tarsus..... | 7. |
| Three claws to tarsus..... | 8. |
| 7.—Legs much shorter than body, cephalothorax with lateral ridges or wing-like expansions..... | Carabodes. |
| Legs slender, posterior pair as long as the body, no wing-like expansions to cephalothorax..... | Belba. |
| 8.—Dorsum composed of concentric rings..... | Liodes. |
| Dorsum different..... | Nothrus. |

ORIBATA Latr.

With a tectal plate wholly united to the cephalothorax ; abdomen furnished with lateral wing-like expansions ; three claws to the tarsus, the middle one larger than the other two. Body more or less globose, smooth, rarely with bristles ; legs shorter than the body and with fusiform joints, thinly clothed with simple hairs, one near the tip of the penultimate joint being much longer than the others.

The genus is very rich in species, and some species are very common. The young are soft-bodied mites, sometimes with one or two large, black spots ; upon attaining the adult form it is usually paler and smaller than when really adult.

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| 1.—With short bristles on abdominal dorsum..... | hirsuta. |
| Without bristles..... | 2. |
| 2.—Wings as high as long, setæ very short..... | arborea. |
| Wings longer than high..... | 3. |
| 3.—Wings small, triangular, not projecting in front of abdomen..... | 6. |
| Wings large, more rectangular, projecting in front of abdomen..... | 4. |
| 4.—Lower border of wing emarginate..... | emarginata. |
| Lower border entire..... | 5. |
| 5.—Abdomen high, convex, a pale spot at base..... | robusta. |
| Abdomen depressed, no pale spot..... | depressa. |
| 6.—Abdomen depressed, without any small smooth spots, legs short..... | moesta. |
| Abdomen high, convex, several small smooth spots..... | 7. |
| 7.—Tectal plate terminated by a distinct transverse ridge..... | pratensis. |
| No ridge, only a bristle each side..... | 8. |
| 8.—No superior bristles, wings more than half as high as long..... | magna. |
| Superior bristles present, wings not half as high as long, very small..... | affinis. |

Oribata pratensis nov. sp.—Length .7 mm. Yellowish or reddish, legs paler; tectal plate broader than long, terminated by a transverse ridge, at each anterior corner is a bristle, superior bristles long; setae of stigmata very short, capitate; abdomen high, smooth, three small, smooth spots each side, the basal one oblong; wings small, about half as high as long, triangular; venter smooth, just in front of the anal opening there is the outline of a short, clavate figure; the genital opening fully twice its length in front of the larger anal opening; a black spot on each side of coxal plate. Legs moderate, the femora broad.

Sea Cliff, L. I., N. Y.; swept from grass in great numbers.

Oribata affinis nov. sp.—Length .8 mm. This species has much the resemblance of *O. pratensis*, having a high abdomen, small wings, broad femora, etc. But it differs in a number of ways; the tectal plate is about as long as broad at base, it is not limited by a ridge; there is a faint suture between the base of tectal plate and the abdomen, in which are two round spots; the smooth spots on the abdomen are smaller and indistinct; the wings are not half as large as in *O. pratensis*, being extremely small; the setae are longer; the genital opening is not quite twice its length in front of the anal; on the coxal plate there is a line each side.

Washington, D. C. Many specimens under the loose bark of a tree.

Oribata magna nov. sp.—Length 1 mm. Reddish, legs paler; tectal plate quite long, no anterior ridge, only a bristle at each corner, no superior bristles; abdomen extremely high and convex, smooth, four small round spots on each side, the three posterior forming a triangle; wings moderate, triangular, fully half as high as long, tip rounded; venter smooth, genital opening not quite twice its length in front of anal; a black spot each side on coxal plate; legs moderate, the femora broad, the posterior pairs distinctly margined; setae of stigmata moderate, clavate.

Sea Cliff, N. Y. Five specimens.

By its large size and convex appearance it resembles *Cephus nitidus*, but is readily distinguished by its wings, etc.

Oribata moesta nov. sp.—Length .55 mm. Red-brown, legs yellowish, have never observed a pale spot at base of abdomen; tectal plate terminated each side by a bristle, no anterior ridge, superior bristles quite long, erect; abdomen but little convex, depressed, smooth, shining; wings small, triangular, tip rounded, nearly one-half as high as long, not projecting in front of abdomen; venter smooth, genital opening one and one-half times its length in front of the larger anal opening; coxal lines nearly complete; legs short; setae moderate, capitate.

Sea Cliff, N. Y. Not uncommon on the ground.

Known by its small wings and flat body.

Oribata depressa nov. sp.—Length .45 mm. Red-brown, no pale spot above, legs yellowish; cephalothorax short, tectal plate terminated each side by a bristle, superior bristles moderate, erect; setae moderate in length, capitate; abdomen smooth, depressed, plainly longer than broad; wings large and long, projecting in front of the abdomen, twice as long as high, convex behind, in front,

and beneath, no emargination; venter smooth, genital opening about twice its length in front of anal opening; a line and a spot each side on coxal plate; legs short.

One specimen, Sea Cliff, N. Y. Differs from *O. robusta* in smaller size, flat body, more rounded wings, and absence of a pale spot.

Oribata robusta nov. sp.—Length .75 mm. Reddish brown, legs yellow, a small white spot at base of abdomen; tectal plate terminated each side by a bristle, superior bristles erect; setae clavate, with a quite long stalk; abdomen convex, highest at about the middle, smooth; wings very large and long, broadly rounded behind and below, entire, projecting much in front of the abdomen and obtusely pointed; venter smooth, genital opening twice its length in front of the very much larger anal opening; coxal plate each side with a line broadest at the outer end; legs moderate.

Three specimens from Sea Cliff, N. Y.; two from Ft. Lee, New Jersey; and one from Washington, D. C. Distinguished by the shape of its large wings, and by its long setae.

Oribata emarginata nov. sp.—Length .75 mm. Black, yellowish at base of abdomen and cephalothorax, tips of legs yellowish, femora often whitish; young specimens more reddish; cephalothorax short and convex, more steep than in allied forms; tectal plate terminated each side by a bristle; superior bristles short, erect; setae moderate, clavate; abdomen broad, high, convex, smooth, shining, two incisions on anterior margin; wings large, somewhat rectangular, projecting in front of abdomen, anterior and posterior sides oblique and convex, rounded beneath on posterior part, strongly emarginate a little in front of middle, venation often quite distinct; venter smooth, genital opening about once and a half its length in front of the larger anal opening; a line on each side of coxal plate; legs as usual.

Not very common, in moss. Sea Cliff, N. Y.; Chicago, Ill.; Brazos County, Texas. Easily recognized by its large, emarginate wing and dark color. A male adult is somewhat smaller.

Oribata arborea nov. sp.—Length .6 mm. Yellow, or reddish brown, often with a white spot at base of abdomen; body moderately convex and high, highest behind; tectal plate terminated each side by a bristle, superior bristles moderate, erect; setae very short, clavate; abdomen smooth, sometimes showing an oblong spot at base; wings as high as long at base, tapering each side to the rounded tip; venter quite smooth, genital opening once and a half its length in front of the much larger anal opening, a short transverse line a little in front of anal opening, two lines each side on coxal plate; legs about as usual, posterior femora broad.

Sea Cliff, N. Y. Common on cedar and peach trees. Readily distinguished by the shape of the wings and by the very short setae.

Oribata hirsuta nov. sp.—Length .4 mm. Wholly pale brownish yellow; cephalothorax triangular, convex, two superior bristles and two marking its tip; setae short, capitate; abdomen not high, a little longer than broad, smooth, ante-

rior margin with two incisions, bearing above about thirty bristles, those near the tip slightly longer than the others; wings moderate, somewhat triangular, rounded, the lower margin incurved; venter quite roughly granulate, the genital opening much more than its length in front of the larger anal opening; two short lines each side on the coxal plate; legs short.

Sea Cliff, N. Y. Quite common, especially in sandy places, under dead leaves. Readily distinguished by its small size, bristly body and yellowish color.

ORIBATELLA nov. gen.

The tectal plate is large and joined to the cephalothorax only at base, the apex free and usually divided into two or more lobes or spine-like projections. The body is more often bristly than in *Oribata*, otherwise it is very similar to that genus.

Though several species are known to me they are all moderately rare, strongly contrasting in this respect with the abundance of several species of *Oribata*.

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| 1.—With some bristles on abdomen..... | 2. |
| No bristles on abdomen..... | 4. |
| 2.—Tectal plate bidentate..... | 3. |
| Tectal plate quadridentate..... | 4-dentata. |
| 3.—Bristles arising from dark spots, wing small, triangular..... | bidentata. |
| Bristles not arising from dark spots, wing large, semi-circular..... | obesa. |
| 4.—Wings armed in front with a large spine..... | armata. |
| Wings unarmed..... | 5. |
| 5.—Tectal plate divided into four long pointed spines..... | aquatica. |
| Tectal plate divided into two truncate lobes..... | signata. |

Oribatella 4-dentata nov. sp.—Length .6 mm. Reddish, legs paler, and a triangular yellow spot at base of abdomen; tectal plate large, divided in front into four long, equal spines, a long bristle each side at the inner base of the outer spine, superior bristles shorter; setae of stigmata short; sides of head concave; abdomen nearly circular, moderately high, base rounded, with about twenty-four long, stiff bristles; wings large, finely reticulate, anterior margins finely dentate, terminating below in a small spine; venter smooth, genital opening about once and a half its length from the equal anal opening; coxal plate with a line each side; legs short, with stiff bristles.

I have one specimen of this fine species from Sea Cliff, N. Y.

Oribatella bidentata nov. sp.—Length .5 mm. Cephalothorax reddish, abdomen nearly black, with a yellow spot at base, legs yellowish; tectal plate narrow, deeply bifid at tip, with a short, stiff bristle at end of each projection; superior bristles long, erect; setae quite long, clavate at tip; abdomen depressed, longer than broad, smooth, with about twenty black patches each giving rise to a bristle; wings moderate, triangular; venter smooth, genital opening not much more than its length from the larger anal opening; coxal plate with a black line each side; legs very short and stout, femora broad, those of anterior pairs margined.

Sea Cliff, N. Y. Uncommon, in moss; to the naked eye it has a black, shiny appearance.

Oribatella obesa nov. sp.—Length .6 mm. Reddish, legs yellowish, a pale spot at anterior edge of abdomen; tectal plate not very large, deeply bilobed, each lobe slightly rounded and with a bristle at tip, superior bristles moderate, suberect; setae short, clavate; abdomen broad, depressed, finely granulate, with a few bristles, most numerous toward tip, no dark spots; a small, oblong, light one each side near base and three rounded ones near tip; wings quite large, nearly semi-circular; venter smooth; legs moderate, a plate behind and one in front of anterior coxae.

Two specimens, one Olympia, Wash. (Trevor Kincaid); the other in a vial of Sea Cliff things, but it may have gotten in by mistake.

Oribatella aquatica nov. sp.—Length .55 mm. Dark reddish, legs yellowish, a pale spot at base of abdomen; body very broad, nearly circular, moderately depressed, smooth; tectal plate short and broad, ending in front in four slender spine-like projections, the lateral ones being sinuate and more closely appressed to the sides of the cephalothorax, the median or dorsal pair slightly curved and with a bristle at tip; superior pair of bristles long, curved forwards; setae moderate, clavate; abdomen large and broad, anterior edge advanced in the middle; wings moderate, oblong; venter smooth, genital opening not much more than its length from the larger anal opening; coxal plate divided.

Not uncommon, Sea Cliff, N. Y. This species lives on aquatic plants, and can walk over the surface of stagnant water very readily; I have kept specimens in an aquarium for several months. There is nothing peculiar in the structure of the feet.

Oribatella signata nov. sp.—Length .45 mm. Dark reddish brown, legs yellowish, a pale triangular spot at base of abdomen; body moderately high, convex, dorsum smooth; tectal plate large, reaching to end of the cephalothorax, triangular, sides slightly concave, truncate in front and deeply bifid, a short stiff bristle at each corner of the lobes; superior pair of bristles long, curved, directed forwards; setae quite long, clavate; abdomen longer than broad; wings moderately large, triangular, projecting somewhat in front, lower margin rounded; venter smooth, genital opening about once and a half its length from the much larger anal opening; a dark line each side on the coxal plate; legs moderate, a little more hairy than usual.

Two specimens, Sea Cliff, N. Y.

Oribatella armata nov. sp.—Length .55 mm. Dark reddish, legs yellowish, a yellow spot at base of abdomen; body high, convex, smooth; tectal plate oblong, deeply cleft, end of each lobe rounded, a small bristle from each; superior bristles moderately long, directed forwards; setae quite long, clavate; dorsum of abdomen with a few indistinct short hairs; wings large, somewhat oblong, with a very large curved spine from the upper anterior margin; venter smooth, genital opening not quite once and a half its length in front of the anal opening; coxal plate divided by a long dark line each side; legs about as usual, a curved plate behind anterior coxae.

Sea Cliff, N. Y. Four specimens.

ORIBATODES gen. nov.

Somewhat resembling the two preceding genera, with a large free tectal plate, wings to the abdomen, legs slender, with fusiform joints and simple hairs, the tarsus with but one claw, the genital opening is large and just in front of the larger anal opening, not well separated from it. The roughened appearance of the only species known to me also distinguishes it from its allies.

Oribatodes mirabilis nov. sp.—Length .5 mm. Dark red-brown, legs barely paler; body short, broad and convex; tectal plate large, the lateral margins somewhat reflected, front margin broad, concave, the corners sharp pointed and each bearing a short, stiff, curved bristle; two superior bristles very long, directed somewhat forward; setæ quite long, clavate; abdomen globose, granulate, with an irregular network of ridges, bearing above about sixteen long, stiff, finely serrate and almost clavate bristles, disposed mostly in a longitudinal row each side, a transverse row of four or six much shorter, distinctly clavate ones at tip; wings moderate, granulate, incurved, not extending in front of the abdomen; venter with some irregular ridges, genital opening large, barely separated from the larger anal opening; coxæ mostly free; legs short, a large curved plate each side of coxæ I.

In rotten débris under loose bark of dead trees, Sea Cliff, N. Y. Five specimens were taken at different times during the Summer; two specimens have the genitalia extruded, so the form must be perfectly mature.

CEPHUS Koch.

Tectal plate free at tip, no wings to abdomen, legs with fusiform joints and simple hairs, three equal claws to tarsus, genital opening much in front of the anal.

The genus has much the appearance of *Oribata*. I have two species.

Abdomen densely punctulate.....**punctulatus.**
Abdomen smooth.....**nitidus.**

Cephus punctulatus nov. sp.—Length .85 mm. Dark reddish, legs paler; cephalothorax narrow, with the tectal plate reaching nearly to tip of head, front quite broad, truncate and cleft, with several short and one long bristle on each side, lateral margins wing-like; superior bristles moderate; setæ short, clavate; surface of tectal plate and cephalothorax finely punctulate; abdomen elliptical, finely and densely punctulate, with two short, stiff hairs on each shoulder, and six near the tip and one each posterior side; venter granulate, anal plates smooth; legs short.

Sea Cliff, N. Y. In a decaying fungus and swept from weeds; rare.

Cephus nitidus nov. sp.—Length 1. mm. Dark reddish, legs yellowish; tectal plate moderate, triangular, appressed to cephalothorax, but from the side

seen to be free, terminated each side by a short stiff bristle, its surface smooth; superior bristles short, erect; setæ moderate, clavate; abdomen large, globose, high, smooth; venter smooth, genital opening more than twice its length in front of the very much larger anal opening; legs short, just behind coxæ I is a large curved plate reaching to the upper corner of the cephalothorax; coxal plate with three complete lines.

Quite common on the ground, under pieces of wood, bark, stones, etc. Sea Cliff, N. Y.; Ft. Lee, N. J.; Washington, D. C. I have two or three much smaller specimens which are proportionally narrower and more depressed, but I think they are the same.

SCUTOVERTEX Mich.

Tectal plate small, united to the cephalothorax; no wings to abdomen; legs with fusiform joints and simple hairs; tarsi with three claws; genital opening some distance in front of anal opening. Of the two species placed here one (*pilosus*) has the claws equal; the other has the middle claw the larger. The former would thus seem to be an *Oppia*, but the tectal plate is quite different from that genus, and moreover the two species appear to be otherwise very closely related.

Abdomen with prominent bristles, as long as the setæ.....**pilosus**.
Abdomen with only very short and fine hairs.....**concolor**.

Scutovertex pilosus nov. sp.—Length .8 mm. Yellow-brown; body moderately high and convex, smooth; tectal plate completely united to the cephalothorax, reaching about half way to tip, two long bristles at tip, superior bristles long, erect; setæ of stigmata short and clavate; dorsum of abdomen with about eighteen or twenty long bristles in four rows; venter finely granulate, genital opening much more than twice its length in front of the larger anal opening, a curved ridge just behind anal opening; coxal plate divided in the middle, a line in front and behind on each side; legs moderate, femora broad; three equal tarsal claws.

Sea Cliff, N. Y.; Ft. Lee, N. J. Quite common in crevices of the bark of trees.

Scutovertex concolor nov. sp.—Length .4 mm. Yellowish brown; tectal plate short, wholly united to cephalothorax, truncate in front, terminated each side by a bristle, superior bristles moderate; setæ quite long, clavate; abdomen somewhat depressed, smooth, longer than broad, with some scattered, very short and very fine hairs; venter smooth or finely granulate, genital opening nearly twice its length in front of the larger anal opening; coxal plate divided and a line each side in front and behind; legs moderate, femora quite broad; tarsal claws unequal, the middle being the largest.

Sea Cliff, N. Y. In dead fungi.

BELBA Koch.

No tectal plate, no wings to abdomen, tarsi with but one claw, no wing-like expansions to cephalothorax; legs long and slender, the hind pair as long as body, the joints nodulate and with simple hairs, the ventral apertures in the typical forms are widely separated.

Abdomen smooth, ventral apertures widely separated. **minuta**.
 Abdomen minutely spinulate, ventral apertures approximate. **australis**.

Belba minuta nov. sp.—Length .45 mm. Yellowish brown cephalothorax convex, triangular, two anterior bristles; two superior bristles erect, shorter than the long, slightly clavate setae; abdomen elliptical, convex, smooth, with about fifteen prominent bristles above; venter smooth, genital opening fully twice its length in front of the much larger anal opening; anterior coxae free, the posterior pairs united into a plate without any line or spot on the sides; legs slender, the posterior pair as long as the body.

Sea Cliff, N. Y.; Chicago, Ill.; Ft. Lee, N. J. This very common mite is chiefly in decaying animal substances, but it frequently occurs in moss, under bark, on the ground, etc.

Belba australis nov. sp.—Length .6 mm. Red-brown, trochanters and femora darker; cephalothorax quite high, two pairs of curved bristles in front, a pair of bristles a little in front of and shorter than the setae, the latter are very long and not clavate, the stigmata prominent; the abdomen is high, convex and minutely spinulate above, and with about a dozen stiff, strongly curved bristles; venter smooth, genital opening barely separated from the anal opening; coxae united into a large plate with two lines each side; legs slender, the posterior pair longer than the body.

One specimen, Shreveport, La. This species might form a separate genus on account of the position of the genital opening, the simple setae, and the structure of the coxae.

CARABODES Koch.

No tectal plate, but with a transverse crest in front of the stigmata giving rise each side to an elevated, often plate-like ridge; abdomen without wings, usually with clavate hairs; legs shorter than body, barely nodulate, provided with simple hairs; each tarsus with one claw; genital and anal apertures usually approximate.

- 1.—The genital opening far in front of anal opening. **oblonga**.
 The openings approximate. 2.
- 2.—Black, four rows of white scale-like hairs. **nigra**.
 Yellowish, clavate hairs mostly at tip. **apicalis**.

Carabodes nigra nov. sp.—Length .5 mm. Black, legs yellowish or reddish; cephalothorax broadly triangular, narrowed behind, a few hairs at tip; crest large, with two large spatulate white hairs above, and behind on each side a circular elevated area which is minutely pitted; the setae of stigmata quite long

and clavate; abdomen broadly elliptical, posterior margin crenulate, with many deep pits above and four rows of four large spatulate white hairs; sides striate; venter smooth, legs short, barely nodulate, the femora thickened, other joints slender, with a few simple hairs; genital and anal apertures large and close together.

Sea Cliff, N. Y. Common in decaying fungi (*Polyporus*); a few specimens found under a piece of bark on the ground.

Carabodes apicalis nov. sp.—Length .45 mm. Reddish, legs yellowish; cephalothorax sub-triangular, anterior sides concave, posterior sides nearly straight, slightly contracted behind, with a curved ridge each side from tip to stigmata, several other smaller ridges, stigmata large, setae short, clavate; two stiff clavate hairs near middle, and two fine hairs at tip; abdomen truncate at base, gradually growing wider, broadly rounded behind, a few irregular ridges each side and above irregularly reticulate with ridges, each side a sub-median row of three clavate hairs and about ten or twelve similar ones around the tip; venter smooth, with two lines each side; genital aperture nearly circular, slightly separated from the anal opening; palpi more prominent than usual; legs short, slightly nodulate, the femora, especially femur I, quite long, the tarsal joints much abbreviated, with very few hairs, except at tip.

Sea Cliff, N. Y. Six specimens.

Carabodes oblonga nov. sp.—Length .55 mm. Black, legs yellowish; cephalothorax truncate in front, covering the pointed head, emarginate, and with four curved stiff bristles, surface granulate, sides consist of plate-like expansions, a large bristle each side, and a smaller median pair; stigmata near margin, setae moderate, clavate; abdomen truncate in front, over once and a half as long as broad, not much broader in middle than at base, tip broadly rounded; surface deeply and finely pitted; with about twenty-eight stiff bristles above, mostly arranged in four rows, those near base project forward over the cephalothorax, the rest are directed toward the apex; venter granulate, the coxae all united to its surface; the genital opening nearly twice its length in front of the anal opening; legs short, barely nodulate, femora thickened, tibiae pedicellate.

Sea Cliff, N. Y. One specimen found under bark of a stump, the bark was not yet dead nor loose. To the naked eye it looks much like a small Scolytid beetle. This species should probably form a new genus on account of the cephalic structure and of the widely separated ventral apertures.

NOTHRUS Koch.

The cephalothorax is immovable; the tectal plate and wings are both absent; the body is more or less rectangular and usually furnished with some clavate hairs; the legs are short and stout; the basal joints about equal in length and in thickness, furnished with stiff, thickened, sometimes clavate hairs; the tarsi are all furnished with three equal claws; the genital and anal openings are very large, and surrounded by several sutures.

Their often roughened appearance and short legs give them a strange habitus. They are found in various situations, in moss (especially *Sphagnum*), under bark, on trees, etc. They move very slowly, and when disturbed will often lie still for several minutes.

- 1.—A pair of curved hairs at tip of cephalothorax.....2.
No such hairs.....4.
- 2.—With only simple hairs at tip of abdomen.....**furcatus**.
Clavate hairs at tip of abdomen.....3.
- 3.—Tip of abdomen deeply excised.....**excisus**.
Tip of abdomen barely excised.....**rugulosus**.
- 4.—With short clavate hairs at each posterior angle of abdomen...**truncatus**.
With long simple hairs at each angle of abdomen.....**bipilis**.

Nothrus truncatus nov. sp.—Length .7-.8 mm. Dark reddish, younger specimens yellowish, with a dark central spot; body quite high behind; dorsum convex, finely granulate; cephalothorax quite long, triangular, contracted above first pair of legs, with a median suture, no hairs in front, a short clavate one each side close to the stigmata, setae of stigmata long and simple; abdomen wider behind, sides slightly sinuate, truncate in front and behind, margin elevated, a sub-marginal ridge converging near tip, a sub-marginal and a sub-median row of five clavate hairs, at each posterior angle a large clavate hair, and a pair of smaller ones near the middle of tip, sides of abdomen smooth; the legs are stout, with a few stiff hairs, finer near the tips. Young specimens are paler and have a lower abdomen.

Sea Cliff, L. I., N. Y. Several specimens from *Sphagnum*, one in some moss on a rock, another under decaying sod.

Nothrus bipilis nov. sp.—Length 1. mm. Dark reddish, sides and venter paler. Similar to *N. truncatus*, but the abdomen much broader and higher, the side piece of abdomen being nearly as high behind as it is long; at each posterior angle of the abdomen, instead of the short clavate hair as in *N. truncatus*, is a very long, curved, simple hair; the genital and anal openings are broader than in the preceding species.

Sea Cliff, L. I., N. Y. One adult and two young specimens from *Sphagnum*.

Nothrus furcatus nov. sp.—Length .7 mm. Reddish brown; body flat; dorsum smooth; cephalothorax triangular, narrowed behind, with a curved ridge each side, two stiff curved hairs in front and two bristles above, seta quite long, not clavate; abdomen gradually growing wider, base truncate, tip broadly rounded, crenulate and bearing eight curved bristles, four bristles on each side margin; above, a sub-marginal ridge each side reaching from base to near posterior angles, between their tips a curved, transverse, sub-apical ridge, in the centre of dorsum a forked ridge reaching from base to near sub-apical ridge, four simple hairs arise from each branch of the fork, a few simple hairs at base of dorsum; legs stout with short, stiff, curved bristles.

Olympia, Wash. [Trevor Kincaid]. Several specimens.

Nothrus excisus nov. sp.—Length .7 mm. Pale brown, legs a little darker; body quite flat; dorsum irregularly roughened; cephalothorax sub-triangular, truncate in front, from each anterior angle projects a stiff curved hair; stigmata elevated, prominent, with a short capitate seta; abdomen truncate in front, slightly broader in the middle, deeply emarginate behind, from each posterior angle projects a roughened clavate hair, and a sub-clavate hair from each side just before the angles, beneath tip a median pair of smaller clavate hairs; starting from near the base there is each side a sub-median ridge, which near the tip curves toward the posterior angles, at point of curvature is a short transverse ridge; on each side margin there are three or four very short clavate hairs; the sides, venter and legs, are all roughened, the latter with stiff, curved bristles, finer near tips; most of the hairs on the body when much magnified are seen to be serrate; the form of the cephalothorax is caused by the development of the upper surface over the anterior end of the head, the latter, as usual, being blunt pointed.

Sea Cliff, L. I., N. Y. On the bark of spruce trees, where it is much protected by its color.

Nothrus rugulosus nov. sp. Length .7 mm. Dark brown, abdomen paler; related to *N. excisus*, but the abdomen is truncate behind, not deeply emarginate, in some specimens a little rounded; there are four large clavate hairs on each side margin, the margins are roughened, but the general surface of the dorsum is smooth, the abdomen is as wide in front as behind, and but slightly wider in the middle; the two hairs, at tip of cephalothorax, are much more clavate than in *N. excisus*, the seta of stigmata is clavate; the legs are roughened and furnished with stiff, curved hairs.

Sea Cliff, L. I., N. Y. Under loose bark of dead trees; a specimen from Chicago, Ill., seems to be the same species.

LIODES Berlese.

This genus differs from *Nothrus* in having the dorsum of the abdomen composed of concentric rings; the legs are more slender and smoother, more like *Oribata* than *Nothrus*, in that the patella is very short compared with the femur and tibia.

We have but one species, which was discovered and described by Say.

Liodes concentricus Say.

Oribata concentrica Say. Comp. Writ. LeConte Ed.

Length 1.3 mm. Black; cephalothorax broadly triangular, narrowed behind, margins serrate, seta short, clavate; abdomen elevated, dorsum composed of four concentric circles, connected to each other by curved lines or ridges, the circles are not perfect, but elongate and pointed behind, the central one is divided by a median line, which is connected to the sides by oblique lines; there are a few fine hairs on the anterior margin of the abdomen; sides and venter granulate, legs quite long, smooth, and with a few simple white hairs.

Washington, D. C. Several specimens under bark of an elm tree. Say had it from Pennsylvania; Enterprise, Fla. (H. G. Hubbard).

HOPLOPHORIDÆ.

This family differs considerably from the Oribatidæ. The cephalothorax is movable, and the dorsal integument of the abdomen is continued down upon the sides and venter, leaving only a small ventral region or true venter, which contains the usual apertures. The legs are shorter and the coxæ more free than in most Oribatids.

One claw to tarsus, ventral region broad.....**Hoplophora.**
Three claws to tarsus, ventral region narrow.....**Tritia.**

TRITIA Berl.

Body more or less oblong, especially in the young; tarsi with three claws; ventral region very narrow, several times as long as broad.

Tritia glabrata Say.

Oribata glabrata Say, Comp. Writ. LeConte Ed.

Hoplophora areolata Riley, vi, Mo. Rept. 1874.

Length 1. mm. Dark red-brown; cephalothorax a little longer than broad, broadly rounded in front, wholly covering the head, smooth, a few hairs in front, at each posterior angle a round stigmata with a simple seta; legs very short-smooth, with simple hairs; abdomen large, high, very convex, truncate in front, smooth, anterior sides oblique, nearly meeting on the venter, only leaving a very narrow slit, which contains a long cleft ridge, the anterior portion being the genital opening, and is terminated by a transverse line; on each side of the slit near the tip is a fine hair; above on the dorsum several scattered, quite long, and very fine hairs.

Common on the ground. Sea Cliff, N. Y. Say's specimen was from Florida. Dr. Riley's *H. areolata*, from Missouri, is, I think, only the young of this species, at least it agrees well with the forms which I take to be the young found on Long Island.

HOPLOPHORA Koch.

Body usually globose, one claw to tarsus, venter quite broad, the apertures usually broader than long.

Hoplophora setosa nov. sp.—Length .6 mm. Cephalothorax and legs yellowish, abdomen dark brown; cephalothorax once and a fourth as long as broad, somewhat pointed in front, above showing two large lateral depressions; stigmata circular bearing a clavate seta, a pair of superior bristles near base and a pair of short stiff ones in front; legs short, finely granulate, and with simple hairs, some very long; abdomen high, globose, convex, smooth, with a basal transverse row of four long bristles, and behind with two longitudinal rows of about four long bristles, the longest bristles are as long as the cephalothorax; venter broad, genital opening broader than long, connate with the equal, posteriorly rounded, anal opening, three hairs on each side of the venter.

Sea Cliff, N. Y. On the ground.

Hoplophora spherula nov. sp.—Length .6 mm. Similar to *H. setosa*, but the body is more globose and higher, and the bristles are not one half so long, barely longer than the setæ, six pairs of them above; the setæ are thick, but taper to a sharp point, spatulate rather than clavate; otherwise about the same.

Three specimens, Sea Cliff, N. Y.